CSCanada
Canadian Social Science
Vol. 11, No. 8, 2015, pp. 97-100
DOI:10.3968/7383

ISSN 1712-8056[Print]
ISSN 1923-6697[Online]
www.cscanada.net
www.cscanada.org

Protection and Development of Loess Cave Dwelling in Western China

HUANG Zhaocheng[a],*

[a]Shandong University of Arts, Jinan, China.
*Corresponding author.

Received 11 April 2015; accepted 20 June 2015
Published online 26 August 2015

Abstract

There are many factors contributing to gradual decline of loess cave dwelling in Loess Plateau, Mid-West China. This paper is aimed at the present situation of loess cave dwelling and tries to make a profound analysis on many aspects, such as natural environment, traditional customs, social ethics and building technologies in a bid to find out the root of declined loess cave dwelling. And then, the author investigated how to protect and develop loess cave dwelling in the future and multiple renovation methods shall be used in this regard. Meanwhile, combining with regional economic development and rural social problems, the author also discussed sustainable development road of loess cave dwelling.

Key words: Loess cave; Dwelling; Rural area; Protection; Sustainable development

Huang, Z. C. (2015). Protection and Development of Loess Cave Dwelling in Western China. *Canadian Social Science, 11*(8), 97-100. Available from: http://www.cscanada.net/index.php/css/article/view/7383
DOI: http://dx.doi.org/10.3968/7383

INTRODUCTION

The author has been paid attention to the unique loess cave dwelling in western China and interested in living status of western rural resident. In recent years, several investigations and researches were made in Shaanxi Guanzhong Plain, northern Shaanxi Plain, Shanxi Jinzhong to provide general information of loess cave dwelling and a deeper experience of resident's life in loess cave dwelling up to now. This paper will discuss the rise and fall of loess cave dwelling and protection & development problems in environmental design perspective.

1. CURRENT SITUATION OF LOESS CAVE DWELLING IN WESTERN CHINA

Loess cave dwelling has survived for thousands of years as a kind of residential structure. Since human were engaged in conscious living activities, living in cave is the first choice for people in northern area. In ancient times, people's living requirements are relatively simple and contented themselves with feeding, clothing and indirect exposure. Loess Plateau in western China provides beneficial environment for cave living due to its unique geographical conditions and land structures. Therefore, this loess area which begins from Taihang Mountains in the east, to the Longdong in the west, from Qinling in the south and to the Great Wall in the north, becomes a gathering place for production and development of loess cave dwelling. However, after thousands of years, loess cave dwelling which played a huge role in architectural history is facing embarrassment of declining in recent decades.

There are many reasons contributing to this situation and the author will start from the origin of loess cave dwelling. The primary reason why large number of loess cave dwellings emerges in Midwest China lies in particularity of geographical conditions. On the vast land in Loess Plateau, western China, there is a very thick layer of loess and this kind of loess has quite strong orthostatic property. Local residents make use of this nature advantage to create such a unique style of living.

Usually caves are divided into sinking type (pit), cliff type, earth covering type and combined type and different forms mainly depends on local terrain conditions. In Weibei and Guanzhong area, as the terrain

is flat, generally pit caves are in the majority. That is, take a whole block on flat land and dug down vertically along four upright walls to form a rectangle pit. Chisel a transverse cave along pit wall pit facade, generally there are two cave dwellings on a façade and three cave dwellings on wide facade. Among which, a ramp is equipped in a cave as a passageway connecting with outside world. The cave can be relatively independent or connected with hole. Generally, cave having a southern exposure will be used as main bedroom and drawing room, house in east and west sides will be used as second bedroom and kitchen, however, the house facing north will be used as kitchen and toilet. The courtyard has grey brick path and an arbor with big crown for shading. Whole kiln courtyard is a complete underground quadrangle dwelling. But in Yan'an, Yulin and Jinzhong, as terrain stretch irregularly and topography are well-arranged which has rows of crosswise caves along loess cliff. These caves show in terraced distribution and roofs of lower caves are courtyard of the upper ones. Sometimes, these cliff type caves are covered with soil to form combined caves.

Natural geographical conditions in loess cave dwelling are difficult to be changed the day after tomorrow. Meanwhile, internal physical environment is also an important aspect attracting people's attention. Whatever sucking, cliff or earth covering caves, as is restricted by topographic condition, caves can only choose one direction as the entrance which limits light casting and convenience of outdoor ventilation. As an only entrance of natural light, arch kiln can not only be applicable to loess structure and but also enlarge day-lighting area. Door opening only occupies one-third of front side and most of rest parts are windows for lighting, which satisfy the needs of indoor lighting to the great extent. Another important factor for the cave is ventilation performance and doors &windows on the front side can meet inside and outside ventilation requirements and compared with external environment, it is warm in winter and cool in summer. More importantly, raw soil for building the cave has microcirculation effect which is similar to natural pollution-free green "air conditioner" for adjusting interior climate. So it is not surprising for such a pleasant environment to attract thousands of people live in cave dwelling.

Laborious Chinese peasant has been living here for generations. Some raw soil caves have already become a heritage for several generations, showing their strong viability. However, according to our investigation, we found that fewer and fewer young people would like to live in cave dwelling in recent years, most of old people and stay-at-home children are left behind. One reason for this situation is economic condition limitations. Majority of young people go out to seek development opportunities; the other reason is influence of local geography. Terrain environment of raw soil dwelling has a big difference. Almost no road can directly reach to doorstep. Inconvenient traffic is a major bottleneck restricting the development of local economy. In perspective of local resident cultural conditions, educational level, concepts and consciousness of development, poor material conditions and distress economic situation does not seem to be the main problem. Affected by urban modern lifestyle, residents living in caves are already unable to calm in facing with origin mode of living existing for hundreds of years. They think that living in "soil" cave is an expression of rustic quality. In order to get rid of this, they must strive for living in high-rise buildings as fashion as city residents. Once this kind of thinking becomes a mainstream, survival status of these caves will be at stake and as a result, gradually decline of loess cave dwelling will become an indisputable fact.

2. REASONS FOR DECLINING OF LOESS CAVE DWELLING

As a heritage of thousands of years of architectural form, loess cave dwelling has a lot of advantages. In addition to warm in winter and cold in summer, using natural, low energy conservative and pollution free materials to build a land conservative, eco-friendly caves have been a development direction advocated in construction field. However, how to make cave residents change ideas, be willing to live in their loess cave dwelling and make them be more comfortable and beautiful than original ones is a difficult problem for our designers. According to our investigation, people living in the caves do not have conflicted moods to these dwellings. Besides advantages of caves, they also have deep feelings upon caves inherited from ancestors. With respect to urban residents living in haze, fresh and beautiful natural environment is also an important reason for them who wouldn't like to give up. Then, what's the reason for they do not want to go on living? Through multidimensional investigation, poor traffic, living and other infrastructures, environment pollution caused by casual treatment of waste water and lagging ideas are main reasons for this situation.

As to ideas, local managers have labeled a laggard mark on residents living in loess cave dwelling. Firstly, attentions shall be paid on residents in loess cave dwelling under the guide of improving living environment and quality of residents. In some places, residents wholly move to newly built brick houses, which are called "new rural renovation". "New rural renovation" plan is far important than cave dwelling protection for those who in power. For them, protection of old buildings is not even smart as building new brick houses by demolishing old buildings. This is like to "urban villages" in cities. They demolish old buildings in whatever means and use all kinds of tricks to move "nail household" or even regardless of deaths. It is really ridiculous that such thing

occurs under social changes background in twenty-first century. Fortunately, in recent years, the government has changed function, fully respect will of local residents during renovation of villages and small towns and do positive and meaningful things to residents.

Secondly, traffic, living and other infrastructures for loess cave dwelling is such as to cause anxiety. Topography particularity in plateau region is the main reason for inconvenient traffic conditions and certain traffic infrastructures are needed in places suitable for building loess cave dwelling, however, the reality is not optimistic. Many villages cannot be directly accessed by vehicles and transport of goods only depends on human or animal power. In addition, no centralized water, electricity, heating and other infrastructures are normal which causes many inconvenience and create a great psychological blow when compared to urban residents, these factors greatly lessened people's wills for living here.

Furthermore, most of loess cave dwellings are lack of garbage and other waste treatment facilities. Arbitrary discharge of garbage, waste water and other wastes causes great environment pollution seriously affecting the life quality of local residents. Plastic bags, kitchen surplus, used clothing and other garbage can be seen everywhere around cave dwellings in Loess Plateau, so original eco-friendly natural environment is suffering damages and erosions. During the visit, the author has saw a primary school student came out from home with a bag of garbage in his hand. He naturally thrown it into roadside drainage ditch 20 or 30 meters away and the ditch is filled with garbage like a natural garbage dumping field. As we all know, plastic waste is difficult to be decomposed in natural environment, even those being buried underground may be decomposed after hundreds or thousands of years. This is very common in this region and urgently needs to be changed.

3. PROTECTION AND DEVELOPMENT OF LOESS CAVE DWELLING

If we leave it continue to develop, gradually decline or extinction of loess cave dwelling is inevitable. Fortunately, person with noble aspirations in China's design industry begin to commit themselves in providing free design to farmers. Pioneer for this is the leader in Chinese environmental art design field-Professor Zhang Qiman. Since the end of last century, Professor Zhang has been focusing on the development of loess cave dwelling and made many contributions to construction and development of loess cave dwelling for the past many years. In 2010, Professor Zhang led teachers and students majored in environmental design of China Central Academy of Fine Arts, Xi'an Academy of Fine Arts, Tai Yuan University of Technology and Beijing Institute of Fashion Technology and selected ten groups of pit caves for free design in Baishe Village, Sanyuan County, Shaanxi Province. They successfully renovated seven groups which is regarded as a model for local rural loess cave dwelling and pioneered the provision of free design to farmers. Through these design innovation, functions of use are improved on the basis of origin loess cave dwelling which increase sanitary facilities, beautify the environment and achieve good effects. Recently, the author made a field research upon these caves in Baishe Village, Sanyuan County, Shaanxi Province. These renovated caves are still occupied and used by local people in intact appearance and good facilities. And affected by this, newly-built caves not far away are still in construction.

In the long process of historical development, everything has its natural development regulation. Generally it is generation, development, prosperity, decline and extinction. Whether it is time for loess cave dwelling to move towards extinction? As a traditional living mode, loess cave dwelling has gone through thousands of years and provides convenient and comfortable living environment for local people in long-term development process. So it can be remained until now. It is cannot be ignored that still thousands of people are living in these dwellings, which fully proves its rationality. However, affected by natural conditions and social values, decline of caves were profiled against the vigorous urbanization. If we want to save loess cave dwelling from extinction, person with noble aspirations shall take protection and heritage responsibilities.

How to protect them? who is responsible for the protection? how should we do? By convention, principle of use for resident dwelling is that it shall be managed by whom lived in, then it is most appropriate for farmers who living in to protect their homeland. But the problem is that, in perspective of above-mentioned culture degree, educational level, ideas and development awareness of local residents, this really stretched them to protect such dwellings as a kind architecture form during living in them. It is unrealistic for solely relying on farmers to protect such cave dwellings while local government is unable to be relied on, so we can only appeal designers with courage and insight to do something. Designers with professional training experience and quality-oriented education not only have professional insight and but also have innovation ability. More importantly, they have the power and shoulder responsibilities to protect cultural heritage and carry social missions. Professor Zhang Qiman and her teams has made a mode in this filed and set an example for local loess cave dwelling protection, which greatly contributed to loess cave dwelling cultural heritage and geographical environment improvement. We appeal more designers to commit in this great cause.

Then let's move onto how to use or develop loess cave dwellings. As an architecture form, loess cave dwelling is a typical example of green, low-carbon and environmental friendly dwellings and is a powerful example of

sustainable development. Raw soil is characterized by low energy consumption, few construction wastes and no environment pollution. Compared with air-conditioning equipments, it is warm in winter and cool in summer which also represents the future development direction of architecture. Specifying to the current situation of loess cave dwelling, how to use or develop these cave dwellings becomes a big problem. The author hereby takes public design & renovation project for loess cave dwellings in western China planned and hosted by Professor Zhang Qiman as example to make detailed analysis.

4. RENOVATION& DESIGN OF LOESS CAVE DWELLING

The project is located in Hengpo Village, Pingyao County, Jinzhong, Shanxi Province and cliff caves on three different topographies as renovation objects. Hengpo Village is in Duancun Town which is 17km in the south away from Pingyao county seat and has 270 households, covers 2.7 km^2 and 780mu farmland. Whole village is situated in hills region with Guangou Rive in the west and Heli River in the east. Economic development mainly relies on planting, cultivation, feed processing, transportation and labor service export and it is actively adjusting industry structure to develop rural tourism. However, it is not attractive for such a distant mountain village without beautiful scenery, comfortable environment, unique buildings and other infrastructure. How to transform Hengbo Village into an attractive place outweighs all other considerations.

The project has three different orientations: transformation of several centralized loess cave dwelling in center position of old village into folk custom exhibition place, redesign and renovation of old and discarded cave dwellings and creation of a public place integrating protection, collection, exhibition and presentation to enrich the old village and add new vitality. Renovation and design of folk custom exhibition place maximally preserve the original shape of cave dwelling, upgrade their functions, restore living conditions of local residents, improve lighting, ventilation, cave reinforcement performance to increase comfort properties. In southern downhill position near folk custom exhibition place, a cave dwelling with nine rooms will be transformed into book center, which mainly be used as a reading, leisure, entertainment, communication space for local farmers. After completion, the book center can also be used for movie, entertainment, wedding, meeting and other activities for enrich local residents' leisure time with a wealth of knowledge and cultures.

Renovation and design of courtyard combines the old and new, takes advantage of original architectural structure and adopts new building materials and local materials. New cave dwellings are configured with solar lighting and hot-water system, water circulating system, natural ventilation and lighting systems to make this discarded courtyard be more vigorous and used as a cultural site for acquiring knowledge and enriching living quality. A cave dwelling traveling hotel is planned to be built as a comprehensive space on loess cliff 200m away from old village in the south to provide tourists with unique style hotels& catering environment and hold small meetings and cultural activities. These three caves are different in functions but interrelated. The first two places are located in the middle part of old village, integrated with it and designed on the basis of no damage to original rustic appearance; the last one is a new cave which breaks limitations of single original spaces. It is designed as a combination of multiple spaces to having structural innovative features.

SUMMARY

Renovation of loess cave dwelling in Hengpo Village follows the principle of natural character restoration, creation of quite rural life as well as introduction of public service project and proper domestic sanitation installations to satisfy requirements of comfortable modern life. Restoration and renovation of discarded old caves shows connation of farming culture and cultural heritage on the basis of respecting local cultural traditions, lifestyle and customs. Meanwhile, it also creates new economic and cultural development mode, build low-carbon, environmental friendly loess cave dwelling and give vitality to rural buildings. Public design & renovation project for loess cave dwellings in western China planned and hosted by Professor Zhang Qiman has achieved a lot and set an example for sustainable development of Loess Plateau in western China. This is a good start.

REFERENCES

China Artists Association, Environmental Design Art Committee of China Artists Association, College of Fine Arts in Shanghai University. (Eds.). (2014). *Design for China· excellent thesis collections of sixth national environmental art design exhibition*. Beijing: China Architecture & Building Press.

Li, Z. X. (2010). *Urban green land system planning and landscape design*. Jinan, China: Shandong University Press.

Lu, Y. D., & Yang, G. S. (2003). *Chinese dwellings (Volume II)*. Guangzhou, China: South China University of Technology Press.

Peng, Y. G. (1994). *Landscape analysis on traditional villages and towns*. Beijin: China Architecture & Building Press.

Wang, J. (2009). *Northwest dwellings*. Beijing: China Architecture & Building Press.

Zhang, Q. M., & Qiu, X. K. (2010). *Design for China*·research *on environmental design for northwest loess cave dwelling*. Beijing: China Architecture & Building Press.